(Rev. 09/19/05)

S/N 10/639,947 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	BROWN et al.	Examiner:	
Serial No.:	10/639,947	Group Art Unit:	1744
Filed:	08/12/2003	Docket No.:	8436.73USC1
Confirmation No.:			
Title:	MECHANICAL COMPOSTING		

DECLARATION OF DR. RONALD WAINBERG UNDER 37 CFR § 1.132

1. I, Ronald Wainberg, declare and state as follows. I have both a B.E. and a Ph.D. in Chemical Engineering from Sydney University. I am an Associate Member of the Institution of Chemical Engineers and a fellow of The Institution of Engineers, Australia. I am also currently the National Knowledge Manager of the Waste Management Association of Australia and immediate Past President of the New South Wales Branch of the Association. I am an expert in the field of Solid Waste Management.

2. I have read and am familiar with the above referenced U.S. patent application and the Office Action mailed from the United States Patent and Trademark Office on February 12, 2003 with respect thereto. I have also read and am familiar with the Preliminary Amendment filed December 27, 2004. The Preliminary Amendment includes claims 20 to 26 that were before the Examiner as claims 35 to 41 and rejected in the February 12, 2003 Office Action. I have considered the rejection of claims under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In particular, I respectfully disagree with the Office Action that one skilled in the art would not know how "to make an insulated, vertical and parallel sided tower composting system to provide" the claimed method. The following comments related thereto are offered.

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3. I rely on the teachings of The Practical Handbook of Compost Engineering, Roger T. Haug (1993) to provide factual demonstration of how one of ordinary skill can make a composting system as claimed based on the teaching of the application. The Handbook is a compilation and explication of compost engineering technology and is well known to persons engaged in the design and operation of composting systems.

4. The specification discusses a number of parameters that a composting system of the invention includes. Specifically, a composting system of the invention is configured to obtain an operation temperature in the primary chamber of between about 45°C and 85°C when breaking down degradable materials at an infeed moisture content of between about 60 and 80% w/w, with an aeration rate that provides an oxygen content that is equal to BOD plus an excess of between three and seven percent. Although the operating parameters of temperature, moisture and aeration rate affect each other, each will be discussed independently and their corresponding basis in the specification as filed will be considered.

5. The invention as recited in claims 20 to 26 provides a composting system that is configured to maintain an operating temperature in the primary chamber of between about 45°C and 85°C when breaking down degradable materials. This temperature range is discussed in the specification at least at page 11, lines 10-13. One of skill in the art knowing the desired temperature range in the primary chamber would know its effect on the composting process. Additionally, the temperature in a biological system within the specified moisture content range is self-limiting, and such temperature results from the chemical energy available in the feedstock and the rate of loss of heat from the pile. The rate of loss is a function of airflow through the pile and the degree of insulation inherent in the compost pile (as covered by Haug, on pages 109-111 and 119, "Estimating Heats of Reaction"). A large compost mass tends to be self-insulating (as covered by Haug on pages 114-119, "Mechanisms of Heat Transfer"). A person of ordinary skill understands that the temperature of a compost pile near the walls of a VCU will be less than at the center of the pile. However, the temperature near the walls needs only to be sufficient to maintain composting. Heat loss by conduction through the walls and roof of the composting tower is generally small. Nevertheless, one of skill in the art with respect to thermal engineering

would know, or be able to calculate, the insulation needed to maintain the desired temperature range resulting from a feedstock as specified (for example, ISO 6946: Thermal insulation - Calculation methods - Thermal resistance and thermal transmittance of building components and building elements).

6. It is generally agreed that one cubic metre is sufficient pile volume to ensure self-heating capability (provided the pile is constructed of suitably balanced materials), and since the typical chamber size in the sample specification is 24.2 cubic metres (table 1b), it can be assumed there is adequate volume for self-heating (Haug, page 119, first paragraph).

7. The composting system of the invention also requires an infeed moisture content of between about 60 and 80% w/w. This parameter is discussed in the specification at least at page 10, lines 3-4. One of skill in the art, knowing the desired moisture content of the infeed would know the amount of water that would need to be added to, or encountered in the feedstock to achieve a moisture content within the prescribed range, using either an OD solids measurement of the feedstock once prepared, or a calculation of the feedstock moisture content from known feedstock component moisture contents according to the equation:

$$((MC_1 * m_1) + (MC_2 * m_2) + \ldots + (MC_n * m_n))/\text{sum } (m_1 \text{ to } m_n)$$

Where MC_n is the moisture content of a mix component
m_n is the mass of a mix component

8. The composting system of the invention also requires airflow that provides an oxygen content that is between three and seven percent in excess of the stoichiometric requirement. Haug indicates that an average stoichiometric oxygen demand of a mixed feedstock is provided by 7.2 g air per g of substrate BVS (Biodegradable Volatile Solids), and that above this amount an Excess Air Ratio (EAR) is normally provided (Haug, page 263). Further, Haug states this EAR comprises two distinct components: an EAR used in drying the substrate and equal to 5.7 times the stoichiometric demand, and an EAR used in cooling the composting mass to a temperature limit of around 65°C, and equal to about 24.6 times the

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stoichiometric demand (Haug, pages 261-277). Clearly, if the composting mass is remaining aerobic, but the temperature in the column is self-limiting, then the stoichiometric oxygen demand is being satisfied, plus some drying of the mass, but little, if any cooling of the mass is occurring. This is discussed in the specification at least at page 6, lines 18-26. One of skill in the art, knowing the desired level of oxygen input, would know that the porosity of the infeed mixture would determine the amount of draft induced by the heat in the column, and hence the excess oxygen present, and that the degree of porosity could be controlled by varying the amount of bulking agent added to the feedstock. Further, the porosity of a given mixture could be calculated from the measured air flow velocity through the column using Darcy's Law:

$$v=K/T(-P/L)$$

where v is the air velocity, T is the viscosity of air, K is the permeability of the mixture, –P is the pressure difference between the base and the headspace of the column and L is the length of medium (height of column here). (Haug, page 524 of "Pressure Drop across Compost").

9. A composting system of the invention can be built knowing the parameters that are required by that system. Moisture content of between 60 and 80% w/w can be estimated or measured using the normal test description of 'moist like a wrung out sponge' and the ability to squeeze a few drops of water out of the mixture, but not have water running freely out of the mixtare. Similarly, the presence of an excess of oxygen can be detected as indicated by predominating aerobic condition of the composting mass using the normal indicators of odor, appearance and presence/absence of leachate. Such processes do not rise to undue experimentation, because one of skill in the art need only optimize, and integrate the various required parameters once the system is built.

10. The specification also provides an example of the claimed composting system (see page 9). The example describes a chamber of side 2.2 m and height of 5 m providing a chamber volume of 24.2 cubic metres, a feedstock of putrescible organic waste mixed with green waste in equal weights, fed at the rate of 0.037 tonnes per day (total mixture), and producing 454 kg of compost product. The example indicates that this will result in a continuous cycle time of 14 days. One skilled in the art would know that a mass loss in the order of a 60% during stabilization of organic waste is normal, and further, that a volume loss in the order of 30% could

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be expected during passage from the top of such a chamber to the base over a 14-day period, as well as some degree of compaction of the material as it approached the compost removal mechanism in the base of the chamber, although these numbers vary widely depending on feedstock composition, as outlined in Haug, page 314.

11. I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date. 3RD OCTOBER 2005

By: Ronald Wainberg

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Serial No.:	10/639,947	Group Art Unit:	1744
Filed:	08/12/2003	Docket No.:	8436.73USC1
		Confirmation No.	6987
Title:	MECHANICAL COMPOSTING		

CERTIFICATE UNDER 37 CFR 1.6(d):
I hereby certify that this paper is being transmitted by facsimile to the U.S. Patent and Trademark Office on October 3, 2005.

By: 
Name: Lisa R. Hill

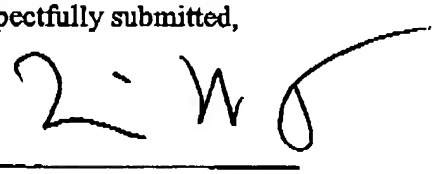
COMMUNICATION AND DECLARATION

Dear Sir:

Please find enclosed a Declaration with respect to the above referenced patent application.

If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,



3 October 2005
Date

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Fax Transmission | January 9, 2006

To:	Examiner David Redding	From:	Oliver Ossanna
Company:		Our Ref.:	8436.73USC1
Your Ref:	10/639,947	Fax No.:	612.332.9081
Fax No.:	571-273-1276	Phone No.:	612.371-5296
Phone No.:	571-272-1276	Total Pages:	12
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Confirmation Via Mail:	☐ Yes ☒ No	Return Fax To:	

Document Transmitted: Courtesy Copy of Communication and Declaration filed October 3, 2005
Message:

Examiner Redding:

A copy of a FAX transmission dated October 3, 2005 of a Declaration relating to enablement issues raised in the above referenced patent application is enclosed. The Declaration does not appear in the file history of the continuation application. During our telephone conversation of January 9, 2006, you indicated that a Declaration had been filed with the parent application. I

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reviewed the file history of the parent application on the PAIR system and was unable to find a record of an earlier filed Declaration.

Very truly yours,

Oliver Ossanna,
Reg. No. 28,335

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Fax Transmission | October 3, 2005

TO:

Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450	FROM: Brian H. Batzli OUR REF: 8436.73USC1 TELEPHONE: 612.332.5300

Total pages, including cover letter: 7

PTO FAX NUMBER 1-571.273.1276

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Title of Document Transmitted:	COMMUNICATION & DECLARATION
Applicant:	Brown et al.
Serial No.:	10/639,947
Filed:	August 12, 2003
Group Art Unit:	1744
Our Ref. No.	8436.73USC1
Confirmation No.	6987

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Name: Brian H. Batzli
Reg. No.: 32,960

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Lisa R. Hill

10-3-05
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Title of Document Transmitted: COMMUNICATION & DECLARATION; Decaration of Dr. Ronald Wainberg along with pages from The Practical Handbook of Compost Engineering referred to therein

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